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UNION CARBIDE NUCLEAR COMPANY • DIVISION OF UNION CARBIDE CORPORATION

POST OFFICE BOX P, OAK RIDGE, TENNESSEE

October 18, 1960

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United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

1960 OCT 19 PM 1 18

Attention: Mr. C. A. Keller, Director, Production Division

Gentlemen:

STUDY OF DISPOSAL OF RADIOACTIVE WASTE

In response to your subject letter of October 13, the attachments provide the information requested for the Y-12 and Oak Ridge Gaseous Diffusion Plants. I have asked the Paducah Plant to handle this directly with Mr. Brooks. With respect to this study, we would like to call your attention to the fact that some of our major problems concerning radioactive waste in the production facilities are primarily those of economics in the storage and handling of contaminated materials. Thus, we would like to urge again that efforts be made to determine if the current disposal criteria are adequate and realistic from the viewpoint of health and safety.

Please advise if further information is needed.

Very truly yours,

UNION CARBIDE NUCLEAR COMPANY

L. B. Emlet, Manager of Production

LBE:HFN:mh

Attachments
(Above Subject)

cc: Mr. C. E. Center
Mr. A. P. Huber
Mr. R. G. Jordan
Mr. J. P. Murray
Dr. J. A. Swartout

#7720

APPROVAL FOR RELEASE

Document: # Unnumbered 1-page ltr, LB Emlet to CA Keller (DOE Oak Ridge) dtd 10/18/60, STUDY ; Date

Title/Subject OF DISPOSAL OF RADIOACTIVE WASTE; and 4-page attachment.

Approval for unrestricted release of this document is authorized by the Oak Ridge K-25 Site Classification and Information Control Office, Martin Marietta Energy Systems, Inc., PO Box 2003, Oak Ridge, TN 37831-7307.

K-25 Classification & Information Control Officer — Date 1/24/93

DISPOSAL OF RADIOACTIVE WASTE

OAK RIDGE GASEOUS DIFFUSION PLANT

(1) General description of activities generating radioactive waste and the type of waste discharged from such activities under your jurisdiction which require ground or water disposal, or containment for long-term storage, burial at site, or shipment off-site for ground or sea burial.

a. Manufacture of uranium hexafluoride results in negligibly small quantities of uranium being discharged to Poplar Creek as low concentration liquid effluent. These result from such activities as floor washing or the final cleaning of shipping drums after any significant amounts of waste uranium produced by the activities of this operation have been recovered.

b. Uranium recovery and equipment cleaning operations may result in small quantities of uranium, usually as a very highly diluted acid solution, being routinely released to Poplar Creek, normally through a settling basin; the uranium in such releases is below discard limits which, based upon economic considerations, are much below those required by health and safety considerations. From time to time, these releases may contain small quantities of fission products mixed as a small fraction of the uranium released. In addition, the negligibly small quantities of uranium which may result from such activities as final floor and equipment cleaning in these facilities will also be released.

c. A fairly large quantity of uranium-contaminated metal scrap and obsolete or depreciated items of equipment are stored above ground as a result of the fact that they cannot be economically cleaned to applicable limits for release as scrap or usable equipment. In addition, other quantities of metal are being held pending decisions upon appropriate release limits; this material includes a large quantity of nickel in ingot form.

d. Absorbents, such as activated alumina, and similar solid waste containing small quantities of admixed uranium are buried.

(2) Description of contractor's organization responsible for:

A. Development, review, and approval of local criteria or changes thereto for effluent discharges and containment standards.

As in other ORGDP activities, the operating supervision of any organization which generates waste materials has the basic responsibility for safe disposal of this waste. These groups

are usually assisted by the Coded Chemicals Department of the Process Engineering Division in the actual transfer and handling of the materials; in many cases involving radioactive material storage or disposal, this department may accept responsibility as the operating supervisor. The Process Utilities Department of the Production Division has the responsibility for normal sewage disposal in accord with appropriate health requirements. The Safety, Fire, and Radiation Control Department of the Industrial Relations Division has the staff responsibility of seeing that such disposal is made safely and in accord with applicable standards and requirements. The appropriate laboratory groups of the Technical Division, upon request, perform the necessary analytical and technical work to develop waste-disposal methods and criteria.

B. Appraisal of operations and compliance with operating criteria and AEC radiation protection standards to include liaison with outside groups or agencies and company-sponsored advisory committees.

The Safety, Fire, and Radiation Control Department of the Industrial Relations Division has the principal responsibility for auditing disposal operations to see that they meet appropriate AEC radiation protection standards and are in compliance with accepted safe practices. This activity also includes liaison with outside groups or agencies and company-sponsored advisory committees. Certain types of disposal, such as the burial of certain solids, is specifically reviewed and authorized by the Commission. In addition, the ORGDP operating and maintenance supervision may also maintain liaison on an operations basis with appropriate industry groups concerned with the same types of problems.

C. Operations and maintenance.

Since the principal source of liquid waste at the ORGDP results from uranium recovery operations and is not necessarily connected with disposal, operation within discard specifications is the prime responsibility of the operating supervision concerned; the Chemical Operations Department of the Chemicals Division has the principal disposal problems. The discard specifications are themselves based primarily upon considerations of economy and are thus much lower than would be necessary for health and safety reasons. In addition to operations, other groups which have the responsibility for certain storage and normal waste disposal activities are the following:

Burial of Contaminated Material - Coded Chemicals Department, Process Engineering Division

Settling Basin Operation - Special Shops Department, Maintenance Division

Outside Storage Location	- Salvage Department, Maintenance Division
Sewage Disposal	- Process Utilities Department, Production Division

(3) Briefly identify current and long-range technical and administrative waste management problems requiring attention, include your comments to assist in their solution.

The plant has essentially no significant technical and administrative waste management problems wherein actual considerations of health would definitely be involved. As noted, the principal plant waste is uranium, and the discard specifications for this material, which are based upon economy, are much more stringent than would be those based on health and safety; hence, potential problems involving this radioactive material are minor. However, it has been found uneconomical to clean metal units and scrap, including smelted material, to present administrative release limits, and this has not only resulted in the necessity for burial and storage programs which may become more serious with the generation of additional slightly contaminated scrap or obsolete equipment but has also caused some economic loss. In addition, the introduction into production operations of trace quantities of fission products and the resultant concentration of these products in the cascade may result in an operational consideration and eventually a waste disposal problem. To date, neptunium seems to be the principal material of concern. The solution of both of these problems would seem to be the development of realistic release and control limits, particularly for release of contaminated metal. We understand that experimental work leading to the determination of criteria for uranium-contaminated metal scrap and work on the development of appropriate permissible limits for neptunium are already underway.

(4) In connection with accidents or unusual incidents incurred within the last two years involving radioactive materials, were any problems encountered on which you might wish to comment from the management standpoint.

The ORGDP has had no significant accidents or unusual incidents during the past two years involving radioactive materials. However, as a part of the plant emergency preparedness program, continuing work has taken place in the development of appropriate administrative means for handling possible radiation emergencies. Thus, simulated radiation incidents have frequently been included in the plant program of emergency drills.

Industrial Relations Division
October 18, 1960

A STUDY OF THE DISPOSAL OF RADIOACTIVE WASTE IN THE Y-12 PLANT

Comments concerning the information requested by the A.E.C. in their letter of October 13, 1960, are listed below.

1. Radioactive wastes and contaminated materials are generated in the course of chemical recovery of uranium from salvable materials, and chemical and metallurgical fabrication of uranium. Typical of these are concentrated depleted uranium wastes, such as crucible oxides and machine turnings, which are not economically recoverable. Such materials are buried, with permission, at the Y-12 low level burial ground. Waste solutions, containing nuisance, non-recoverable amounts of uranium, are pumped to open pits. Materials contaminated with high specific activity contaminants, such as plutonium, are transported to ORNL for disposal.

2. Local criteria for effluent discharge and containment standards are designed to meet the requirements of the applicable authorities. Controls are designed to protect the uncontrolled population as well as employees.

   a. These criteria are developed, reviewed, and approved by representatives of the Production, Development and Safety Staff Groups. A continuing appraisal of operations is performed through routine sampling of ground water and air, as well as visual audits of the disposal sites.

   b. Liaison is maintained with consulting groups such as the U.S. Geological Survey and ORNL Wastes Disposal. Information obtained through monitoring programs is routinely reported through the Y-12 Plant Quarterly Report and by special reports, as requested.

   c. Waste disposal activities in Y-12 are performed by the Salvage Department of the Maintenance Division under the specific guidance of the Production Department and Safety Groups. Sites are maintained periodically as need occurs; however, burial procedures are specific and lead to good control of the disposal area.

3. Waste management problems have been recently resolved by the establishment of the new burial ground and approval to bury concentrated non-salvable uranium wastes.

4. No significant accidents or unusual incidents have occurred within the last few years involving radioactive materials.

ChemRisk Repository Number: 773 Document Number: SO3565
Title: "Study of Disposal of Radioactive Waste"
Authors: L. B. Emlet
Abstract: Letter to the USAEC from the Manager of production at K-25 responding to a request from AEC for waste disposal information. Attachments to the letter detail the activites generating radioactive waste and the type of waste discharged from the activities for both K-25 and Y-12.
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Document title Study of Disposal of Radioactive Waste

Author(s) (indicate other divisions or organizations, if applicable) Emlet, L.B

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☐ Formal Report ☐ Progress Report ☐ Informal R&D Report ☐ Abstract ☐ Drawing
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